

Optimal hierarchical clustering of multivariate data from X-band Doppler radar.

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Correct interpretation of radar observations requires an accurate understanding of microphysical processes and well-developed techniques that automatise their recognition in both the spatial and temporal dimensions of the data. This can be achieved by analysing the temporal dynamics from Quasi—Vertical Profiles (QVPs), where QVP's are retrieved from the polarised radar observations and compared to available ground-based and airborne in-situ measurements.

This study presents a technique which allows the identification of different types of precipitation in multi-variate data from QVPs. The precipitation types are identified as clusters belonging to the hierarchical structure. The method obtains the optimal number of clusters by implementing a recursive process. The obtained optimal clustering will be used to label the original data and to analyse the temporal evolution of the labelled microphysical processes.

To ensure robustness of the underlying method the study identifies the main factors impacting the reliability of identification and address the identifiable difficulties arising in the data.